

CLAIMS

1. A laser arrangement, comprising  
a resonant cavity that is resonant to one or more  
5 fundamental frequencies;  
a solid state laser material provided in the  
resonant cavity for emitting at least one of said one or  
more fundamental frequencies when being irradiated by  
pump light;  
10 pumping means for providing pump light to said laser  
material;  
a non-linear optical element provided in the  
resonant cavity, said non-linear optical element being  
adapted to convert one or more of said fundamental  
15 frequencies into a frequency converted beam;  
wherein at least one cavity mirror defining the  
resonant cavity is highly transmitting for said frequency  
converted beam;  
**characterized in that**  
20 a quarter wave-plate and a retro-reflector for the  
frequency converted beam are arranged in series in the  
beam path outside the cavity adjacent to said cavity  
mirror, such that the frequency converted beam leaving  
the cavity through said mirror undergoes a polarization  
25 rotation and re-enters the cavity in a polarization state  
orthogonal to its original polarization state.
2. A laser arrangement as claimed in claim 1, wherein  
the cavity is defined by a first cavity mirror, a second  
30 cavity mirror and a folding mirror, said folding mirror  
defining a first cavity branch between said folding  
mirror and the first cavity mirror and defining a second  
cavity branch between said folding mirror and the second  
cavity mirror, the non-linear element being provided in  
35 the second branch, and wherein the second mirror and the  
folding mirror are both highly transmitting for the  
frequency converted beam.

3. A laser arrangement as claimed in claim 1 or 2,  
wherein the retro-reflector (M4) has a radius of  
curvature and a position with respect to the resonant  
cavity in order for two cross-polarized output beams to  
5 overlap spatially and exit said cavity as a single beam.

4. A laser arrangement according to any one of the  
preceding claims, wherein the non-linear element  
comprises a quasi phase-matching grating.

10

5. A laser arrangement according to claim 4, wherein  
the non-linear element comprises a periodically poled  
potassium-titanyl-phosphate (PP-KTP) crystal.

15

6. A laser arrangement according to any one of the  
preceding claims, wherein the laser material comprises a  
neodymium-doped crystal selected from YAG,  $\text{YVO}_4$  and  $\text{GdVO}_4$ .